Case No.: 21664YP

Page: 4

Listing of Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A compound of formula (I):

$$R^2$$
 R^3 R^4
 R^1
 S
 N
 N

wherein:

R¹ is selected from the group consisting of:

- (1) $-C_{1-6}$ alkyl,
- (2) -C₂₋₆ alkenyl,
- (3) -C₀-6alkyl-C₃-6 cycloalkyl,
- (4)

$$R^{la}$$
 R^{lc}
 R^{lc}
 R^{ld}
 R^{ld}
, and

(5) heteroaryl selected from the group consisting of furyl, pyranyl, benzofuranyl, isobenzofuranyl, chromenyl, thienyl, benzothiophenyl, pyrrolyl, pyrazolyl, imidazolyl, pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, indolyl, indazolyl, benzimidazolyl, quinolyl and isoquinolyl,

wherein

- (a) said alkyl, alkenyl or cycloalkyl is unsubstituted or substituted with one or more halogen, -C₁₋₆alkyl, -C₁₋₆alkoxy, hydroxy or cyano, and
- (b) said heteroaryl is unsubstituted or substituted with one or more halogen, -C₁-6alkyl, -C₁-6alkoxy, phenyl, hydroxy or cyano,

and wherein R1a, R1b, R1c, R1d and R1e are selected from the group consisting of:

Case No.: 21664YP

Page: 5

(a) hydrogen,

- (b) halogen,
- (c) cyano,
- (d) hydroxyl,
- (e) -C₁₋₆ alkoxy,
- (f) $-C(=O)-O-R^{7a}$,
- (g) -O— $C_{0-6}alkyl$ —C(=O)— $R^{7}a$,
- (h) $-N-R^{7}a-S(O)_{p}-R^{7}b$,

or R^{1b} and R^{1c} are linked together to form -O-CH₂-O- or -CH=CH-CH=CH-;

wherein said aryl is unsubstituted or substituted with one or more halogen, -C₁₋₆alkyl, -C₁₋₆alkoxy, hydroxyl or cyano;

R² is selected from the group consisting of:

- (1) hydrogen,
- (2) halogen,
- (3) -C₀-6alkyl-Q¹-C₁-6alkyl, wherein Q¹ is O or S,
- (4) -C₁₋₆alkyl, and
- (5) hydroxyl;

R³ is selected from the group consisting of:

- (1) hydrogen,
- (2) -C₁₋₆alkyl,
- (3) -C0-6alkyl-C3-6cycloalkyl,
- (4) $-C_0$ -6alkyl- Q^2 - C_1 -6alkyl, wherein Q^2 is O, S or -C(=O)-O-, and
- (5)

$$R^{3a}$$
 R^{3b}
 R^{3c}
 R^{3c}
 R^{3d}

(6) —CH2-heteroaryl, wherein said heteroaryl is selected from the group consisting of furyl, pyranyl, benzofuranyl, isobenzofuranyl, chromenyl, thienyl, benzothiophenyl, pyrrolyl, pyrazolyl, imidazolyl, pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, indolyl, indazolyl, benzimidazolyl, quinolyl and isoquinolyl,

Case No.: 21664YP

Page: 6

wherein said alkyl or cycloalkyl is unsubstituted or substituted with one or more

- (a) halogen,
- (b) -C₁₋₆alkyl,
- (c) -C2-6alkenyl,
- (d) -C₁-6alkoxy,
- (e) $-C_{6-10}$ aryl,
- (f) hydroxyl, or
- (g) cyano,

and said heteroaryl is unsubstituted or substituted with one or more

- (a) $-C_{1-6}$ alkyl,
- (b) $-NR^3fR^3g$, wherein R^3f and R^3g are selected from the group consisting of:
 - (i) hydrogen,
 - (ii) -C₁₋₆ alkyl,
 - (iii) $-C_{1-6}$ alkyl $-C_{6-10}$ aryl, wherein said aryl can be substituted or unsubstited with halogen, cyano, C_{1-6} alkyl or C_{1-6} alkoxy, or
 - (iv) $-C_{1-6}$ alkyl-NR⁷aR⁷b,

or N, R^{3f} and R^{3g} together form a 5 or 6 membered heterocyclic group, optionally containing an N, S or O atom in addition to the N atom attached to R^{3f} and R^{3g};

and R^{3a}, R^{3b}, R^{3c}, R^{3d} and R^{3e} are selected from the group consisting of:

- (i) hydrogen,
- (ii) halogen,
- (iii) cyano,
- (iv) hydroxyl,
- (v) -C₁₋₆ alkyl,
- $(vi) -O-R^{7a}$,
- (vii) -(C=O)-O-R⁸,
- (viii) $-NR^{7a}-S(O)_{p}OR^{7b}$,
- $(ix) -NR^{7}a S(O)_p R^{7}b$,

Page: 7

$$(x)$$
 -C₀₋₆alkyl -S(O)_m R⁷a

$$(xi) - C(=O) - NR^{7}aR^{7}b$$

$$(xii) - C(=O) - R^8$$

$$(xiii) -NH-C(=O)-R^{7}a$$
,

$$(xv) -N_3$$

$$(xvi) - NO_2$$
,

(xvii) C₆₋₁₀ aryl, wherein said aryl can be unsubstituted or substituted with one or more

- (A) halogen,
- (B) cyano,
- (C) – C_{1-6} alkyl,
- (D) -C₁₋₆ alkoxy,

$$(E) - C(=O) - O - R^{7}a$$

$$(F) - C(=O) - R^{7}a$$

$$(G) - NR^{7}aR^{7}b$$

(H)
$$-NR^{7}a-S(O)_{D}-R^{7}b$$
,

(I)
$$-NR^{7}a-C(=O)-R^{7}b$$
,

$$(J) - NO2$$

(xviii) heteroaryl selected from the group consisting of furyl, pyranyl, benzofuranyl, isobenzofuranyl, chromenyl, thienyl, benzothiophenyl, pyrrolyl, pyrazolyl, imidazolyl, pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, indolyl, indazolyl, benzimidazolyl, quinolyl and isoquinolyl,

wherein said heteroaryl is unsubstituted or substituted with one or more

$$(A) - C_{1-6}$$
 alkyl, or

(B)
$$-C_{1-6}$$
 alkoxy;

or $R^{\mbox{\footnotesize 3c}}$ and $R^{\mbox{\footnotesize 3d}}$ are linked together to form phenyl or the group -O-CH2-O- or -CH=CH-CH=CH-;

or R^2 and R^3 are linked to form a carbocyclic ring (A):



Case No.: 21664YP

Page: 8

wherein Q³ is selected from the group consisting of:

- $(1) CR^{7}aR^{7}b_{-}$
- (2) -CR7aR7bCR7cR7d.
- (3) CR7a = CR7b-,
- (4) -CR7aR7bCR7cR7dCR7eR7f.
- (5) -CR7a=CR7bCR7cR7d-, and
- (6) -CR7aR7bCR7d=CR7e-;

R⁴ is selected from the group consisting of:

- (1) hydrogen,
- (2) halogen,
- (3) -C₁₋₆alkyl,
- (4) -C₂₋₆alkenyl,
- (5) –C2-6alkynyl,
- (6) phenyl,
- (7) benzyl, and
- (8) heteroaryl selected from the group consisting of furyl, pyranyl, benzofuranyl, isobenzofuranyl, chromenyl, thienyl, benzothiophenyl, pyrrolyl, pyrazolyl, imidazolyl, pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, indolyl, indazolyl, benzimidazolyl, quinolyl and isoquinolyl,

wherein said alkyl, alkenyl, alkynyl and phenyl is unsubstituted or substituted with one or more

- (a) halogen,
- (b) cyano,
- (c) hydroxyl,
- (d) phenyl,
- (e) $-C_{1-6}$ alkyl,
- (f) $-C_{1-6}$ alkoxy,
- (g) $-C(=O)-O-R^{7}a$,
- (h) $-C(=O) -R^{7}a$,
- (i) NR7aR7b
- (j) $-NR^{7}a-S(O)_{D}-R^{7}b$,
- $(k) -NR^{7}a -C(=O) -R^{7}b$,
- $(1) -NO_2;$

and said heteroaryl is unsubstituted or substituted with one or more:

Case No.: 21664YP

Page: 9

(a) $-C_{1-6}$ alkyl,

(b)
$$-C(=O) -O-R^{7}a$$

(c)
$$-C(=O) -R^{7}a$$

- (d) $-NR^3fR^3g$, wherein R^3f and R^3g selected from the group consisting of
 - (i) hydrogen,
 - (ii) -C₁₋₆ alkyl,
- (iii) $-C_{1-6}$ alkyl $-C_{6-10}$ aryl, wherein said aryl can be substituted or unsubstited with halogen, cyano, C_{1-6} alkyl or C_{1-6} alkoxy, or

(iv)
$$-C_{1-6}$$
alkyl $-NR^{7}$ a R^{7} b;

or R³ and R⁴ may be joined together to form a 6-membered carbocyclic ring (B):

(B)
$$X^{1}$$
 X^{2} X^{3} X^{4} X^{5} X^{6} X^{6} X^{1} X^{2} X^{5}

provided that when R^3 and R^4 are joined together to form (B) then R^1 and R^2 are selected from the group consisting of hydrogen or C_{1-6} alkyl, and X^1 , X^2 , X^3 , X^4 , X^5 and X^6 are selected from the group consisting of hydrogen, C_{1-6} alkyl, C_{3-6} cycloalkyl, cyano, alkylaryl or phenyl,

or R³ and R⁴ may be joined together to form a 7-membered carbocyclic ring (C):

(C)
$$Y^3$$
 Y^5 Y^6 Y^7 Y^8 Y^1 Y^2 Y^1 Y^2 Y^2 Y^1 Y^2 Y^2 Y^3

provided that when R^3 and R^4 are joined together to form (C) then R^1 and R^2 are selected from the group consisting of hydrogen, C_{1-6} alkyl or phenyl, or R^1 and R^2 can be linked together by the group – $CH_2CH_2CH_2$; and Y^1 , Y^2 , Y^3 , Y^4 , Y^5 , Y^6 , Y^7 and Y^8 are selected from the group consisting of hydrogen, C_{1-6} alkyl, C_{3-6} cycloalkyl, cyano, alkylaryl or phenyl,

or R1 and Y5, or R1 and Y7, are linked together by -CH2-,

Case No.: 21664YP

Page: 10

or R¹ and Y¹, or Y¹ and Y³, are linked together to form a phenyl or cyclopentyl ring;

R^{7a}, R^{7b}, R^{7c}, R^{7d}, R^{7e} and R^{7f} are selected from the group consisting of:

- (1) hydrogen,
- (2) C1-6 alkyl, and
- (3) C₆₋₁₀ aryl;

wherein said alkyl or aryl is unsubstituted or substituted with one or more halogen, $-C_{1-6}$ alkyl, $-C_{1-6}$ alkoxy, hydroxyl or cyano;

R⁸ is selected from the group consisting of:

- (1) hydrogen,
- (2) C1-6 alkyl, and
- (3) C₆₋₁₀ aryl, wherein said aryl is unsubstituted or substituted with one or more halogen,
- -C₁-6alkyl, -C₁-6alkoxy, hydroxy or cyano;

n is 0, 1, 2 or 3

m is 0 or 1;

p is 1 or 2;

and pharmaceutically acceptable salts thereof, and individual enantiomers and diastereomers thereof.

- 2. (Original) The compound of Claim 1 wherein R³ is selected from the group consisting of:
- (1) -C₁₋₆alkyl,
- (2) -C₀-6alkyl-C₃-6cycloalkyl,
- (3)

$$R^{3a}$$
 R^{3b}
 R^{3c}
 R^{3c}
 R^{3d}
, and

(4) —CH₂-heteroaryl, wherein said heteroaryl is selected from the group consisting of furyl, pyranyl, benzofuranyl, isobenzofuranyl, chromenyl, thienyl, benzothiophenyl, pyrrolyl,

Case No.: 21664YP Page: 11

pyrazolyl, imidazolyl, pyridyl, pyrazinyl, pyrimidinyl, pyridazinyl, indolyl, indazolyl, benzimidazolyl, quinolyl and isoquinolyl.

The compound of Claim 2 wherein R³ is 3. (Original)

$$R^{3a}$$
 R^{3b}
 R^{3c}
 R^{3c}

and n is 1.

4. (Original) The compound of Claim 2 wherein R¹ is

and m is 0.

- The compound of Claim 4 wherein R1a, R1b, R1d and R1e are hydrogen, and 5. (Original) R1c is selected from the group consisting of halogen, C1-6 alkyl and C1-6 alkoxy.
 - 6. (Original) The compound of Claim 2 wherein R² is hydrogen.
 - The compound of Claim 2 wherein R⁴ is hydrogen. 7. (Original)
 - 8. (Original) The compound of Claim 1 which is a compound of formula (III)

Case No.: 21664YP

Page: 12

$$\mathbb{R}^{1}$$
 \mathbb{R}^{2}
 \mathbb{R}^{4}
 \mathbb{R}^{1}
 \mathbb{R}^{3}
 \mathbb{R}^{4}
 \mathbb{R}^{4}
 \mathbb{R}^{1}
 \mathbb{R}^{1}

9. (Original) The compound of Claim 8 wherein R¹ is

and m is 0.

- 10. (Original) The compound of Claim 9 wherein Q3 is selected from the group consisting of
- $(1) CR^{7}aR^{7}b_{-}$
- (2) -CR7aR7bCR7cR7d-, and
- (3) -CR7aR7bCR7cR7dCR7eR7f-.
- 11. (Original) The compound of Claim 10 wherein R^{1d} is selected from the group consisting of halogen, C₁₋₆ alkyl, C₁₋₆ alkoxy and cyano, and R^{1a}, R^{1b}, R^{1c} and R^{1e} are hydrogen.
- 12. (Original) The compound of Claim 9 wherein R^{1b} and R^{1d} are selected from the group consisting of halogen, C₁₋₆ alkyl, C₁₋₆ alkoxy and cyano, and R^{1a}, R^{1c} and R^{1e} are hydrogen.
- 13. (Original) The compound of Claim 8 wherein Q^3 is selected from the group consisting of $-CH_2CH_2$ and $-CH_2CH_2CH_2$.
 - 14. (Original) The compound of Claim 1 which is a compound of formula (IV)

Page: 13

$$X^{2}$$
 X^{3}
 X^{4}
 X^{5}
 X^{6}
 X^{6}
 X^{1}
 X^{5}
 X^{6}
 X^{6}
 X^{1}
 X^{1}
 X^{2}
 X^{3}
 X^{4}
 X^{5}
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 X^{5}
 X^{6}
 X^{1}
 X^{1}
 X^{2}
 X^{2}
 X^{3}
 X^{4}
 X^{5}
 X^{5

The compound of Claim 14 wherein R¹ and R² are hydrogen. 15. (Original)

The compound of Claim 1 which is a compound of formula (V) 16. (Original)

17. (Original) The compound of Claim 1 which is selected from the group consisting of

and pharmaceutically acceptable salts thereof.

18. (Original) The compound of Claim 1 which is selected from the group consisting of

Example	Structure CH ₃ CH ₃
8	S NH ₂
9	CI NS NH,
10	CI NH
11	CI NH3
12	S N=(NH;
13	O H ₃ C CH ₃ S NH ₃
14	H ₃ C _O NH ₃
15	H ₃ C CH NH ₃
16	CI CH ₃ S NH ₃
17	CI NH3
18	H ₃ C O N N N N N N N N N N N N N N N N N N

Example	Structure
30	NH3
31	CI NH ₂
32	CI N N N N N N N N N N N N N N N N N N N
33	$N=$ NH_3
34	H ₃ C ₂ ONH ₃
35	CI NH,
36	CI NH ₂ O CH ₃ O CH ₃ O CH ₃ O CH ₃
37	NH;
38	S N=(NH ₃
39	NH ₂
40	H ₃ C.ONH3

Example	Structure
52	N=S NH ₃
53	NH3
54	Br NH ₂
55	N NH3
56	H_2C NH_3
57	H ₂ C NH ₃
58	H_3C NH_3
59	H_3C N N N N
60	N=\NH's
61	H ₂ C NH ₃
62	N=\SNH_3

Example	Structure
63	NH3
64	H ₂ C NH ₃
65	H2C.OH2
66	H ₃ C. _O Ni S
67	H ₃ C _{-O} H ₃ S NH ₃
68	H ₃ C ₂ O N ₁ S _{NH₃}
69	NH3
70	S NH
71	NH3
72	NH;
73	ONH;

Example Structure

74

75

76

$$CH_3$$
 NH_3

77

78

 $N_N^{-1}N_N^{-1}$

79

 $N_3^{-1}N_N^{-1}$

80

 $N_3^{-1}N_N^{-1}$

81

82

 $N_3^{-1}N_N^{-1}$

81

82

 $N_3^{-1}N_N^{-1}$

83

 $N_3^{-1}N_N^{-1}$

84

 $N_3^{-1}N_3^{-1}$

85

 $N_3^{-1}N_1^{-1}$

87

 $N_3^{-1}N_1^{-1}$

88

 $N_3^{-1}N_1^{-1}$

89

 $N_3^{-1}N_1^{-1}$

Example	Structure
85	H ₃ C CH ₃
86	O Br S NH;
87	H ₃ C N= S NH ₂
88	F N S NH ₂
89	N H=NH ₂
90	S NH,
91	N=S NH;
92	N=\S NH ₃
93	S N= NH ₂
94	H ₃ C NH ₂
95	S NH ₂

Example	Structure
96	H ₃ C ₋₀ N S NH ₃
97	H,C. O N= S NH,
98	H ₃ C. ON N N N NH3
99	H ₃ C. _O NH ₃ SNH ₃
100	H,C.ONNH,
101	H,C.ONN,
102	H ₃ C. NH ₃
103	H,C. ON NH;
104	NH3
105	CH ₃ O O O O O O O O O O O O O O O O O O O
106	CH ₃ S H NM ₃

Example	Structure
107	CH ₃
108	CH2 SH2
109	CH ₃
110	CH ₃ O O O O O O O O O O O O O O O O O O O
111	H ₃ C ₂ O N N N N N N N N N N N N N N N N N N N
112	H ₃ C·O
113	H ₃ C-O
114	H ₃ C ⁻⁰ S NH ₃
115	H ₃ C·O
116	H,C.O NH,
117	H,C.O HINH,

Example	Structure
184	H ₃ C N S NH ₃
185	H ₃ C. ₀ CH ₃ SNH ₃
186	H ₃ N, O. CH ₃
187	H ₃ C. ₀ N N N NH ₃
188	H ₃ C ₁ O N=S NH,
189	H,C.ON NH2
190	H ₃ C ₂ O NH ₂ S NH ₂
191	H ₃ C ₋₀ N=\s
192	F S NH,
193	F S S NH;
194	H ₃ C-N S NH ₃

Example	Structure
195	S CH3 NH3
196	H ₃ C. O NH3
197	HO S NH2
198	H ₃ C. _O N= S
199	C.N. NES
200	H ₃ C. _O OH N='s NH',
201	F F F NH ₂ S NH ₂
202	H ₃ C ₋₀ OH
203	H ₃ C CH ₃ OH N=S NH ₃
204	H ₃ C ₋₀ OH
205	CH3 ONS NH3.

Example	Structure
217	H ₂ C ₁ C ₁ C ₁ C ₂ C ₁ C ₂ C ₂ C ₁ C ₂ C ₂ C ₂ C ₁ C ₂
218	H,C.S.N.
219	H,C.ONNS
220	H ₃ C _{.0} NH ₃
221	H ₂ C. ₀ N=S NH ₃
222	H ₃ C. _O N _N S NH;
223	H ₃ C. _O NH ₃
224	H ₃ C·O N= S
225	H ₃ C. _O N _N S NH ₃
226	H ₃ C ₁ O NH ₃ S
227	H ₂ C. ₀ N _N S NH3

Example	Structure
228	H ₂ C ₁ O N ₂ S N ₃ S
229	O. N. S. NH,
230	H,C.O NH,
231	H ₃ C _{.0} NH ₃ 's
232	H ₃ C-0 N=S NH ₃
233	H,C.O.N.S.
234	H ₃ C _{·O} S NH ₃
235	H,C. ON N
236	H,C,O,S,D,NH,S
237	H ₃ C. _O NH ₃ S
238	H ₃ C.0

Example	Structure
239	H.C.O. NY
240	H,C.O NH;
241	H,C.O Noti
242	H ₃ C N N N N N N N N N N N N N N N N N N N
243	HE.O. N. S.
244	H ₃ C. ₀ H ₃ C. ₀ N= N= NH' ₁
245	H ₃ C ₀ N _N S _{NH3}
246	H ₃ C. ₀ N _N S NH ₃
247	H ₃ C. _O N=(S)
248	H,C.O No.
249	H ₂ C ₂ C ₂ C ₃

Example	Structure
250	H,C.O NH,
251	H,C.ONH,
252	H,C.ONN=S
253	H ₃ C·O NH ₃ S
254	O.N. CH, H,C.O. N. S. NH,
255	H ₃ C. O CH ₃
256	H,C,O,O,O,O,O,O,O,O,O,O,O,O,O,O,O,O,O,O,
257	H ₃ C ₁ O N=S NH;
258	H ₃ C. NH ₃
259	H,c.o
260	H ₃ C. _O CH ₃ S NH ₃ NH ₃

Example	Structure
261	H ₂ C. ON NH ₂
262	H ₃ C ₁ O N ₂ S NH ₃
263	O-N-S NH,3
264	O-N-S F-N-S N-S NH3.
265	O.N. CH,
266	H,C. OH,
267	0-N-S
268	O-N-S H,C.ON-S NH,S
269	0-N-S
270	H,c. o NY S

Case No.: 21664YP

Page: 39

and pharmaceutically acceptable salts thereof.

. . . .

19. (Original) The pharmaceutical composition comprising a therapeutically effective amount of a compound of Claim 1 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable carrier.

- 20. (Original) A method for treating Alzheimer's disease in a patient in need thereof comprising administering to the patient a therapeutically effective amount of a compound of Claim 1 or a pharmaceutically acceptable salt thereof.
- 21. (Original) A method of inhibiting HIV protease in a subject in need thereof which comprises administering to the subject a therapeutically effective amount of a compound of Claim 1 or a pharmaceutically acceptable salt thereof.
- 22. (Original) A method of treating infection by HIV in a subject in need thereof which comprises administering to the subject a therapeutically effective amount of a compound of Claim 1 or a pharmaceutically acceptable salt thereof.
- 23. (Original) A method of treating AIDS in a subject in need thereof which comprises administering to the subject a therapeutically effective amount of a compound of Claim 1 or a pharmaceutically acceptable salt thereof.